
1. Beads

Program Name: Beads.java

Input File: beads.dat

You are the necklace construction optimization manager at the ACME necklace construction factory. At your job, the necklace designer optimization manager gives you a sequence of n beads they would like to make into a trial necklace. The company doesn't want to produce just one size of necklace, they want the necklaces to be adjustable and variable in size, while still keeping the same pattern. Thus, your job is to find the smallest subsequence of beads in the sequence that can be put together multiple times to construct the whole sequence. For example. If you are given the sequence "ABABAB", the sequence you would return is "AB", and if you are given the sequence "ABCAB" you would return "ABCAB", since there exists no smaller repeated sequence. Also, the program should be case sensitive, so for "ABAb" it would return "ABAb".

Input

The first line of input will contain a single integer that indicates the number of necklaces to analyze. Each of the next n lines will be the sequence of beads to analyze.

Output

For each line, output the minimum subsequence of beads that can construct the whole necklace.

Example Input File

4

AAAAAAAAAAAAAAAA

ABABAB

ABCAB

ABAb

Example Output to Screen

A

AB

ABCAB

ABAb